### **REMARKS**

Claims 1 and 5-8 are pending in this application. An amendment to claim 1 is presented in order to more particularly point out, and distinctly claim the subject matter to which the applicants regard as their invention. The applicants respectfully submit that no new matter has been added. Entry of the amendment is respectfully requested. It is believed that this Amendment is fully responsive to the Office Action dated **August 10, 2004**.

Support for the amendment to claim 1 may be found on page 8 of the specification, lines 4 to 3 from the bottom of the page.

Claims 1 and 5-8 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. 6,316,089 to Ohtani et al. in view of U.S. 5,847,036 to Takabatake et al. as set forth in section 4 of previous Office action. (Office action paragraph no. 2)

The rejection is overcome by the amendment to claim 1. In the amendment, the polymer (b) has been limited such that "the particle diameter of the polymer (b) is 300 to 5000 Angstroms (Å)." Applicant submits that this limitation is not taught or suggested by the cited references, the teachings of which are discussed below.

#### Regarding Ohtani et al. (US 6,316,089)

To illustrate the difference between the present invention and Ohtani et al., the following table compares the present invention and Example 2 of Ohtani et al.

U.S. Patent Application Serial No. 09/926,160 Response filed November 22, 2004 Reply to OA dated August 10, 2004

| The Present Invention  | Ohtani 's Example 2   |
|--|---|
| (e) unsaturated polyester, vinyl ester   | unsaturated polyester (Rigolac FK-2000)   |
| (a) acrylic type polymerizable monomer, SP-8.1 to 10.0                                   | styrene monomer (column 10, lines 20 to 27)   |
| or more and that can be obtained in powered form, consisting mainly of either polymethyl | organic quaternary boron compound (BP3B) 0.12 parts low-shrinkage agent (such as the example polymethyl methacrylate) |
| (c) photocuring agent  | photocuring agent (visible light polymerization initiator I-1800) 1.0 part  |
| (d) fibrous reinforcement photocurable sheet-form material                               | fibrous reinforcement photocurable prepregnated sheet   |

Ohtani et al. (column 22, line 15) discloses polymethyl methacrylate as an example of a low-shrinkage material that may be contained in the composition. Ohtani, in column 22, lines 19 to 23, discloses: "Amounts in excess of 40 parts by weight results in degraded moldability due to excessively high viscosity, and in addition, decreases in smoothness of the surface of the cured product and in heat resistance." On the other hand, in the present invention, polymer (b) is added to increase the viscosity, which is a different purpose than acting as a low-shrinkage agent.

A polymethyl methacrylate used as a low-shrinkage agent is normally polymerized by the suspension polymerization method. This point is widely known, as supported by a definition of

"suspension polymerization" from a chemical dictionary (*Dictionary of Chemistry 3*) listing the example of polymerization of polymethyl methacrylate. (See attached copy of reference.)

The present specification, on page 8, lines 9 to 3 from the bottom, discloses that polymer (b) of the present application is usually produced in an emulsion form by **an emulsion polymerization method**, with the emulsions having a particle diameter ranging from 300 to 5000 Å (30 to 500 $\mu$ m). As disclosed on page 9 of the specification, lines 2 to 4, during drying, the particle diameter ranges from 20 to 100  $\mu$ m even when aggregated, being understood to be the particle diameter in the emulsion polymer.

In the present amendment to claim 1, the particle diameter is limited to 300 to 5000 Å, thereby distinguishing from Ohtani et al. The polymethyl methacrylate of Ohtani et al. is an ordinary one, and therefore would be obtained by **suspension** polymerization. Such a polymethyl methacrylate has a particle diameter of 1 mm or more, and there would be no overlap of the size of Ohtani's polymer with the claimed range for polymer (b).

Also, Ohtani et al. discloses that thickening is performed by prepolymerization with a specified visible light absorbing dye and visible light polymerization initiator (column 5, lines 6 to 17), while in the present application viscosity increases by swelling and dissolving of the polymer (b). Since the present invention does not involve photopolymerization as in Ohtani et al., it has the advantage of thickening being easy to control.

Further, Ohtani et al., in column 10, lines 20 to 27, makes no disclosure of the use of "an acrylic type polymerizable monomer with an SP of 8.1 to 10.0" as recited in claim 1. In fact, there

appears to be no mention of the SP value, and therefore no teaching or suggestion for any value for

this parameter.

Moreover, Ohtani et al., in column 10, lines 4-5, lists only a styrene monomer as the possible

polymerizable monomer. Example 1 of Ohtani et al. discloses a nonstyrenic resin but is unclear

about the monomer. The present rejection is based on substitution of the "styrene monomer serving

as reactive diluent" in Ohtani et al. by an acrylic type monomer, but Applicant submits that there is

no clear suggestion in the reference for this substitution.

Regarding Takabatake et al. (US 5,847,036)

Takabatake et al. relates to an acrylic molding material with aluminum hydroxide blended

as a filler in a resin composition called an acrylic syrup (comprising an acrylic polymer and acrylic

monomer).

Accordingly, Takabatake's invention differs in particle diameter from polymer (b), "a

polymer which is either polymethyl methacrylate or a polymer consisting mainly of methyl

methacrylate units ... produced in a powdered form having a weight average molecular weight of

100,000 or more, and wherein the particle diameter of the polymer (b) is 300 to 5000 Angstroms

(Å)" of claim 1, as amended.

Takabatake et al. (column 4, lines 27 to 34) discloses that "bulk polymerization is preferable

due to the good thickening condition of the resulting molding material"; that is, the (meth)acrylic

polymer of Takabatake et al. is produced by bulk polymerization. It is common technical

-7-

knowledge that the polymer of the present invention having a particle diameter of 300 to 5000

Angstroms cannot be obtained by the manufacturing method of Takabatake et al.

Applicant notes that Takabatake et al.'s polymer is not an unsaturated polyester resin, which

is one of the possible components (e) of the present invention, in addition to differing from polymer

(b) of the present invention.

Moreover, Takabatake et al. does not disclose that the polymer works as a thickener when

producing a molding material.

Therefore, Takabatake et al. does not disclose or suggest a component consistent with

polymer (b) of the present invention. Moreover, regarding a photocurable sheet, Takabatake et al.

makes no disclosure or suggestion in relation to the SP value of (a).

Regarding the combination of Ohtani et al. and Takabatake et al.

As noted above, neither Ohtani et al. nor Takabatake et al. discloses the limitations of

polymer (b) of claim 1, as amended. In addition, neither reference discloses or suggests the SP value

recited in claim 1, and Applicant has noted that the Ohtani does not appear to suggest that the

styrenic monomer as reactive diluent be substituted by an acrylic monomer.

In addition to these points, Applicant notes that the object of the present invention is to

"provide a sheet-form material which is excellent in productivity, handleability and photocurability,"

an object not disclosed in Ohtani et al. and Takabatake et al.

-8-

In light of the above differences, Applicant submits that a photocurable sheet such as that of the present invention which is excellent in productivity, handleability and photocurability could not be obtained even by combining the teachings of Takabatake et al. with those of Ohtani et al.

Applicant therefore submits that the present claims, as amended, are novel and non-obvious over Ohtani et al. and Takabatake et al., taken separately or in combination. Entry of the amendment and reconsideration of the rejection are respectfully requested.

In view of the aforementioned amendments and accompanying remarks, claims 1 and 5-8, as amended, are in condition for allowance, which action, at an early date, is requested.

If, for any reason, it is felt that this application is not now in condition for allowance, the Examiner is requested to contact Applicant's undersigned agent at the telephone number indicated below to arrange for an interview to expedite the disposition of this case.

U.S. Patent Application Serial No. 09/926,160 Response filed November 22, 2004 Reply to OA dated August 10, 2004

In the event that this paper is not timely filed, Applicant respectfully petitions for an appropriate extension of time. Please charge any fees for such an extension of time and any other fees which may be due with respect to this paper, to Deposit Account No. 01-2340.

Respectfully submitted,

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HANSON & BROOKS, LLP

Daniel A. Geselowitz, Ph.D.

Agent for Applicant Reg. No. 42,573

DAG/mla Atty. Docket No. **011145** Suite 1000 1725 K Street, N.W. Washington, D.C. 20006 (202) 659-2930

23850

PATENT TRADEMARK OFFICE

Enclosure:

Copy of "Dictionary of Chemistry 3"; Dictionary of chemistry editorial committee, publ. Kyoritsu Shuppan Co., Ltd., pp. 456-457 with partial

translation.

Petition for Extension of Time

H:\FLOATERS\DAG\DAG\01\011145\amendment nov 2004



## An English Translation of Reference

Dictionary of Chemistry 3

Editor: Dictionary of chemistry editorial committee

Publisher: Kyoritsu Shuppan Co., Ltd.

Suspension polymerization: A polymerization method in which a monomer is dispersed in a medium (mainly water) that does not dissolve the monomer at all or hardly dissolves it and, using a polymerization initiator that is hardly soluble in the medium and easily soluble in the monomer, a polymerization reaction is initiated within small droplets of the suspended monomer. The polymerization takes place in the shape of the dispersed droplets, with the eventual polymer often obtained as beautifully transparent particles or pearl shaped, leading to this polymerization method also being called particulate polymerization or pearl polymerization. The monomer is dispersed by mixing in water and an ordinary dispersion stabilizer or auxiliary stabilizer is added. In emulsion polymerization, various processes such as salting out, cleaning, dehydration and the like are required when removing a polymer from a polymer latex. However, in suspension polymerization, the polymer particles sink when mixing is stopped, simplifying the separation operation. A highly stable polymer is obtained with only small impurities in the generated polymer, making fabrication also easy. The size of the obtained polymer particles is inversely proportional to the mixing speed. Stabilizers are broadly classified into water soluble polymers and hardly soluble, finely powered inorganic compounds. The former include gelatin, tragacanth gum, starch, methy-cellulose, carboxymethylcellulose, polyvinyl alcohol, polyacrylate, while the later include barium sulfate, calcium sulfate, barium carbonate, calcium carbonate, magnesium carbonate, calcium phosphate, talc, bentonite, diatomaceous earth, clay and the like. Usable catalysts are mainly those insoluble by water and easily soluble by monomers, with highly active catalysts such as benzoyl peroxide and 2,2- azobisisobutyronitrile well suited. The polymerization mechanism is simple compared to emulsion polymerization, being essentially the same as bulk polymerization, with the speed format also identical for both. However, in the case of bulk polymerization, the polymerization reaction does not proceed uniformly due to a rise in viscosity of the entire system and internal reaction heat, making temperature adjustment difficult. By contrast, in suspension polymerization, heat can be easily removed by the catalyst, making it suitable for industrial polymerization reaction, and there are no difficulties involving



# **SHIGA** INTERNATIONAL PATENT OFFICE

mixing. However, as shown in the following table, a polymer with as high a degree of polymerization as in emulsion polymerization is not obtainable. Vinyl chloride, styrene, methyl methacrylate are polymerized by this method.

Comparison of polymerization methods

| Type of Polymerization    | Polymerization method        | Catalyst               | Temperature control | Polymerization<br>speed | Polymerization<br>degree | Polymerization shape |
|---------------------------|------------------------------|------------------------|---------------------|-------------------------|--------------------------|----------------------|
| Bulk polymerization       | Monomer only                 | Monomer<br>dissolvable | Extremely difficult | Large                   | Large                    | Lump shaped          |
| Solution polymerization   | Monomer +<br>catalyst        | Solvent dissolvable    | Difficult           | Small                   | Smatt                    | Paste shaped         |
| Emulsion polymerization   | Water + emulsifier + monomer | Dissolvable in water   | Easy                | Extremely large         | Extremely large          | Latex shaped         |
| Suspension polymerization | Water + monomer              | Monomer<br>dissolvable | Easy                | Large                   | Large                    | Pearl shaped         |

上數本 定值3,500円

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PRINTED IN JAPAN C 1980 核数配氧を結ず NDC 430.3

b折すれば元の化合物を知ることが比較的容易 こあるが、有棋化合物は炭素。水塞および酸素 jあるいは有機物質の構成元祭を検出し、そのiのを定める方法、無機化合物はそのイオンを 生体としている一連の化合物であるので, そ )構成元紫である炭紫, 水素あるいは酸素を飲 .b. そこでこれら有機化合物の場合は,その i成分元素の百分率を求めて,この結果から分 してもその元の化合物を判別することはでき 称される (一 イメウ, 塩素, 酸盤, 炭漿, (素, 有機分析). これに対して, ある物質を元 "式を遊ぎ,その上で元の化合物を判別したく はならない. このように有機化合物の分析は 抗成氏分元素の百分率を単独に水めてゆかなけ **ばならないので、元雲分析あるいは遠皮分析** ・のままの状態で分析しようとする分析を近成 析とよぶことがある (一 X 数分析法). 石炭 にまでパラバラに分解せずに, 存在している (反本-氏亞) 元素分析に関しては石段の項を参照。

同位体の存在型が成少することをいう。この とばは普通はウランの場合に使用される。た げんそん 減損 [stepletion] 核反応ま は同位体分階の結果, ある元霖について特定 が収扱である。また同位体分格数置を用いて U と 234U の分盤を行なうと、一方では 235U とは原子炉の中で核分裂などの核反応を超こ 致が減って taU/saU の比が小さくなる。こ 製器のむた繊細ウェンだのからが、一方に食 が (多少たりとも) 除かれた破損ウランを りかすとして生ずる。この場合には破損は没 TAU がいわゆる燃焼を起こすと、 げんそん 波損 [Adepletion] で対することはでもる.

ass D の含有量が低少したウラン ſ≌depleted 減損—— げんそんウラン anium] ^ 選拉

U けんたい 俊体 [英sample, test body, test 液体中に固体の配割粒子が分 格局沈降するが、粒子が散船なほど沈降速度 おそく、比較的長く分散状態が原たれる。通 試料に対し特に繁学. したものをいう。分散粒子は取力の作用によ 医肉液という場合はアルミナや反散カルシウ **砂末のように,粒子が内限または顕散鏡で見** る程数のものをさすが、以く路域コロイド\* 平。生物化学部門などで用いられることば、 けんだくえき 配過液 [#suspension TR Probe] spension bstance

pensoid, suspension colloid aSuspen-これをつくるには分散法\*, 寝集法® 资体中に图体コロイド粒子が安定に かんでいる状態をいう、 慰園液とよぶ場合も 5. 金, 水酸化麸, イオウなどのゾルはこの 阿阿阿阿 ナんだくコロイド 慰鰌――

(古岡県丁年)

も合めてよぶにともある。

用いられる触媒としては、もっぱら,水不溶性

などの特別な方法をとらねばならない。 またい ったん生成したものも一般に不安定で联結しや である.髭陶コロイドはそのままでは一般に不 すく, 母時間保存するためには安定剤#が必要 (七配文語) **可逆コロイド\*でもら**.

て水)中に不溶性の固形薬品を均等に分散させ た彼剤である、通常,この分散を均一に、かつ 安定にするため蒸加する物質を懸濁化剤 (sns-淡(主とし pending agent)といい、広く用いられるものに **はアラピアゴム,トラガカントゴム,アルギン** 慰ナトリケム, ペントナイト, メチル七ジャー 用いられる. 処方例:(日本薬剤師協会飼剤技 紡委員会編,調剤指針) 荷酸バリウム 150g,カ リン 0.04g, フホンイッカンメ 1cc, 水 350cc ス、カルボキシメチルセルロースナトリウムな どがあるが、時に、単シロップ、グリセリンも ルポキシメチルセルロース 2.08, 密性サッカ (個久保教別) けんだくざい 慰濁剤 [#suspension Suspension E Suspensiones] (耐粉化)

けんだくしつ 認適質 [#suspensoid, sus-|| || || || || es Suspensoid) pension colloid 7 けんだくじゅうごう 懸濁重合, サスペンジ [ Fsuspension polymerization く溶解しないか、またはほとんど溶解しない媒 体(主として水)に塩畳体を分散させて,製体 に薩徐で杉豊体に易存性の宣合開始剤を用い、 経費した単量体の小さい適内で重合反応を進行 で置合が進行し、最後の置合物が美しい透明な 粒子ないし真珠状としてえられる場合が多いので,この面含法を粒状置合\*またはパール置合 とよぶこともある. 単数体を水の中へかきまぜ させる頂合方法で、分散した小濱の形痣のまま て分散させ, 通常分散の安定剤, 補助安定剤を 磁加する, 乳化塩合\*では 重合物ラテックスか 乾燥などの緒工程が必要であるが、暖渇塩合で はかきまぜを止めると国合体粒子が枕降するか 5分原標性がきむめて耐単であり,生成置合体 中の不植物がわずかで、安定版の高い東合体が 你られ、成形加工も容易である、得られる値合 体粒子の大きさは, かきまぜる遠度に反比例す 分子と短溶性の微粉末状の転機化合物に大別さ る. 安定数として用いられるものは, 水部性商 れ、前者にはゼラチン、トラガカントゴム、デン プン,メチルセルロース,カルボキシメチルセ 5 置合物を取り出す際に, 塩粉, 洗净, 脱水, アロース, ポリピィルアゲコーグ, ポリアクリ ル酸塩などが属し, 殻当には腐酸パリウム。 祇 校録ャグポシウム, リン酸カルシウム, タルク. 軽カルシウム, 炭酸パリウム, 炭酸カルシウム, ペントナイト. ケイソウ土. 粘土などが属する #Suspensionspolymerisation]

で単量体易溶性のものが用いられ、 過酸化ペン ゾイル, 2.2-アゾビスイソブチロニトリルなど 合機構に比し順単で,本質的には規収重合\*と 同様で, 遠度形式も両当は同一である。 ただ塊 状塵台の均合は系金体の粘度の上昇や内部反応 の活性の大きい油煤がよい. 重合模構は乳化型 烈のために、置台反応が均一に進まず、その遺 度調節がしにくいが, 既獨豊合では媒体によっ て容易に触が除去されるので工票的規模の匿合 **伏婆のように乳化重合ほどには重合度の高い**重 合体は得られない、塩化ピニル,スチンン,メ 反応に適し, かききぜの困難もない、しかし, リル酸メチルなどはこの方法で重合する。

| はない。                                      |                | 開発を行う。 | (1) 大<br>(1) 大<br>(1) | 20 大 人           | の<br>で<br>で<br>で<br>で<br>大<br>大<br>大 |
|---|----------------|--------|-----------------------|------------------|--------------------------------------|
| 风北叠台 全共元化 水水可溶<br>中雄鱼岸<br>跨海崖台 水土化鱼炸中鱼体同河 | 水江山湖山田寺田山田寺田山田 | 10 CG  | なれた                   | ζ <sup>1</sup> 1 | チャイ・ド・ドイ・ド                           |

けんだくしょうほう 魔過床法 [Asuspen.id process #Suspensoid Prozess] -**サスペンッイド接触分解法** soid process

けんだくぶっしつ 緊溺物質 [Asuspended matter, suspended particle Basuspendierter 木の南リ度\*の原因となるもので,溶解物質\*に 対原する. 水を使用する路壁関的質は一般に好 まれない. たとえば飲料水\*としては懸渦物質 中に含まれる微生物,有機物の存在が不適当で カン鉛水では発ボウ\*の原因をなる、軽適物質は原水をガラスフィルターで 中沿して測定する・野海物質の除去は沈降分類、中過によって または飛結剤を加えてファック\*を起こさせて ちることは当然であるが、工業用水\*としても. たとえば製紙工場の用水は低の光沢を損じ,汽 化学的に状降させたのち分類し、なお残る賠適 水中に丹漂している敵小物質のこと 行なう、すなわる貯水池で自然改降させるか。 | 竹質は砂巾通で除く・→ セストン (山辺東町)

(₹suspension る方法をいう. 比置既知の重依として用いられ 低物粉末または粉体の密度を、比 **揖呪知の浴液に張濁させることによって決定す** 2.8), あるいはザウン商政 (ヨウ化水銀カリウムの漫写溶液, d 3.17) などがある・ 宿政未知 るものにロールバッパ俗液\* (は3.58)、チール の試料粉末(重液と化学反応を起こさないもの の仔沈の判断から大約の密笈を求める,比重路 シュトール搭談(過塩紫酸鉛窒温飽和倍散。 (知识於一個) にかぎる) を強々の比値をもつ堕液に加え, 州風觀 紅\*などに用いられる。 けんだくほう method]

ケンタニウム 【ffKentanium】 → 部結段 化物合金

1886.3/3~. アメリカの生化学者. Connecticut 州 Sourth Norwalk の生れ. Columbia 大 年New York の St. Luke 病院に励務.この間 学より学位を得る。 1910~1911 年 Detroit の Parke Davis 会社の研究化学者, 1911~1914 甲状センに関する研究を続けた。 1914 年 Mayo 診療所生化学部長, 1945 年より生化学図法 1915 ルタチオンを結晶させ、化学的 性質を 確定した・20年近くも 割シン皮質ホルモンK部でる 研究を行ない、種々な化合物を単編、同定し、 ニルチゾンの部分合成に成功。また 1949 年り Medal, 1945年 Squibb家, 1949年 P.S. Hench ウェチボの他の成気になする使用について無古 した. 1921年 John Scott 賞. 1925 年Chandler とともに Lasker 質、その他多くの質と名案学位を受け、組々な科学会会員となる。 1950 年 年甲状センの活性成分チャキシンを分揺し、 母長, Mayo Foundation 生型化学教授. Edward 1 - ペル医学生理学質を受賞.

E.C. Kendall 於國少 ケンダルのかごうぶつ Kendall's compound

ケンダルの化合物A = 11-デヒドロコルチ

-C = T = 7 v 7 + y -3a. 118. 17a. -- B == コルチコステロ 21-テトロール-20-オン

-- D = 7 # 7 \ V 7 + y - 3β, 11β. 17α. 208,21-ペントール

-G = T=71/1/1-38.17a.21-1 ニ ヒドロコルチプン 

--- H = 7 ロブ ν グ ナン-3β. 21-ジオ ル-11, 20-ジオン

カンラン石を含んだキング ゠岩の一値. スコットランド Argylishire 処方 Kentallen を原産地とする、1900 年 J.B.Hill F kentallenite チングー品 と H. Kynaston が命名した ケンタフンだん #Kentallenit]

[₹gentian root 1 1 3 0 AV ゲンチアナこん #Enzianwurzel]

9 > F & Gentiana scabra Gentianin] ConHaNO:=175. センブリ Swerfia japonica Mak. の全草.

の根など、リンドウ料の値 物に分布しているアルカロ 白色生状晶 (石油ペンジンがの再

KENDALL. ケンダル

ン皮質から単綴した化合物。

コステロン

-- 医 ニョルチゾン

リオール-11.20-シオン

CH+CH2 BG. var. Buer geri Maxim [1] {\int gentianine ケンナレコン

ケンチブ

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